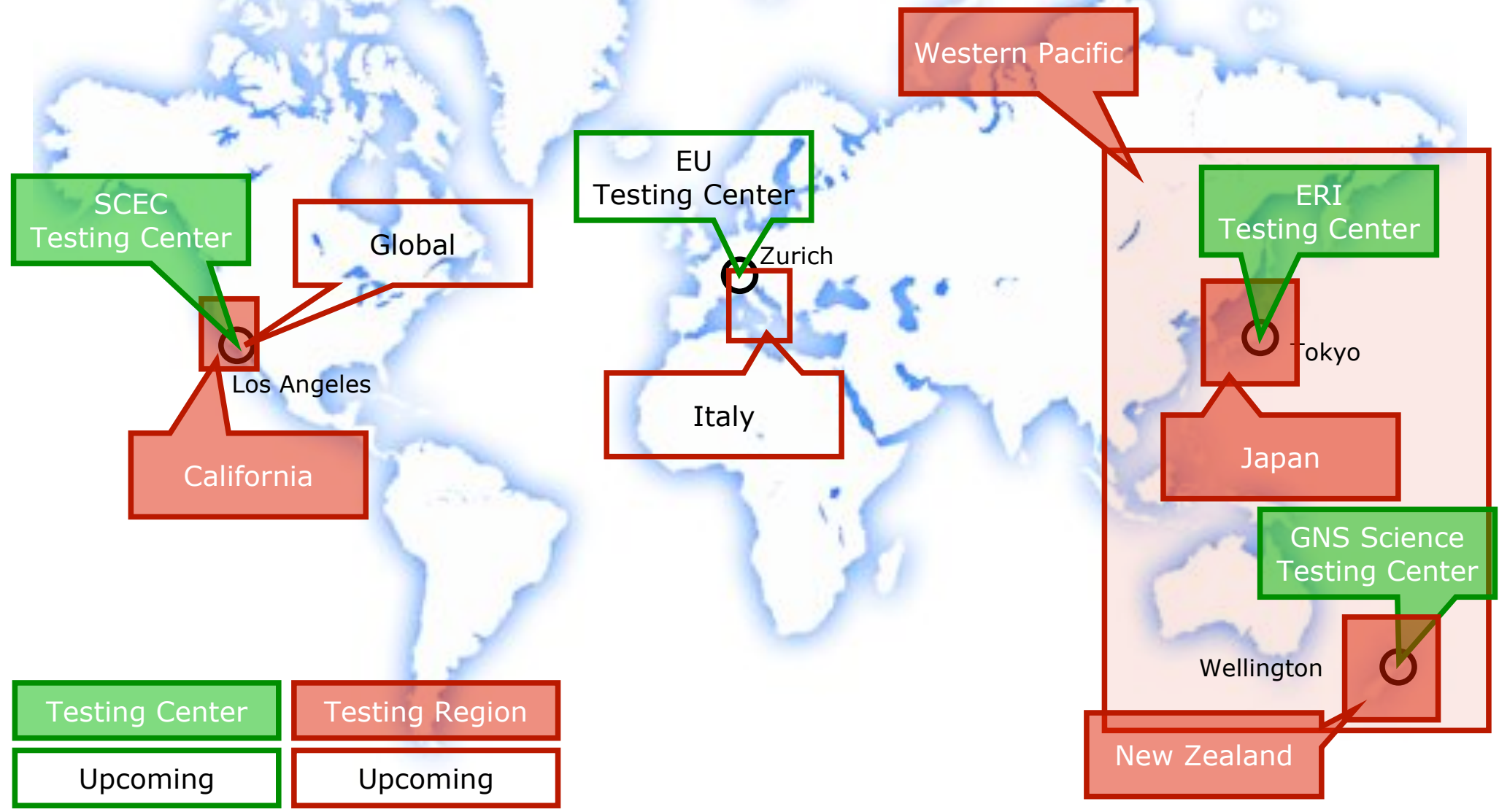# Collaboratory for the Study of Earthquake Predictability (CSEP)

Recent Developments
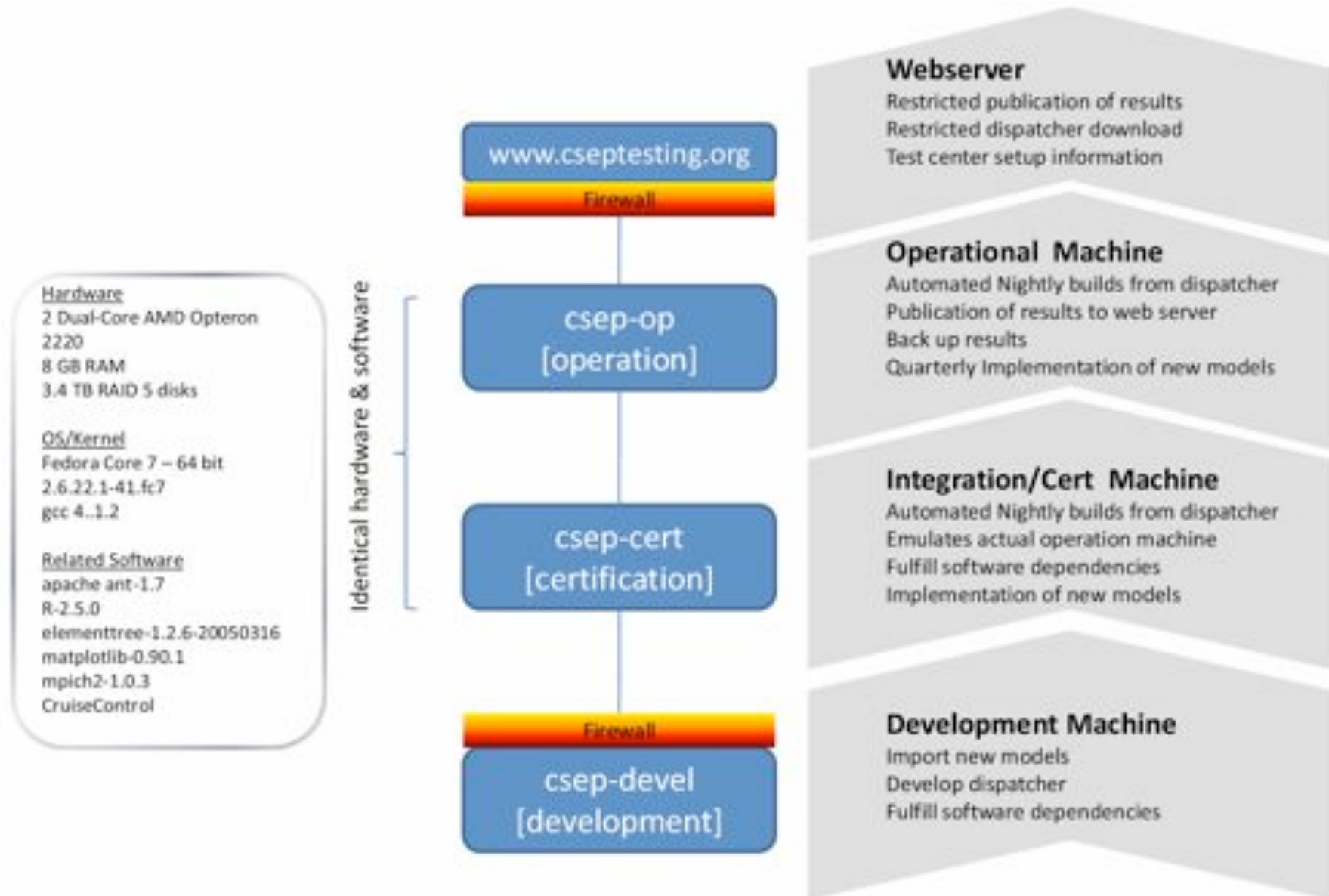
SC/EC

CSEP

Collaboratory for the Study of Earthquake Predictability

SCEC Testing Center Operations Overview

Hardware
2 Dual-Core AMD Opteron 2220
8 GB RAM
3.4 TB RAID 5 disks

OS/Kernel
Fedora Core 7 – 64 bit
2.6.22.1-41.fc7
gcc 4..1.2

Related Software
apache ant-1.7
R-2.5.0
elementtree-1.2.6-20050316
matplotlib-0.90.1
mpich2-1.0.3
CruiseControl

Identical hardware & software

www.cseptesting.org

Firewall

csep-op [operation]

csep-cert [certification]

Firewall

csep-devel [development]

Webserver
Restricted publication of results
Restricted dispatcher download
Test center setup information

Operational Machine
Automated Nightly builds from dispatcher
Publication of results to web server
Back up results
Quarterly Implementation of new models

Integration/Cert Machine
Automated Nightly builds from dispatcher
Emulates actual operation machine
Fulfill software dependencies
Implementation of new models

Development Machine
Import new models
Develop dispatcher
Fulfill software dependencies

CSEP Web-Presentation Concept

3 Websites

- Main CSEP website **www.cseptesting.org**
- Regional websites (editable)
  - **us.cseptesting.org**
  - **jp.cseptesting.org**
  - **nz.cseptesting.org**
  - **eu.cseptesting.org**
- Result website (restricted access)
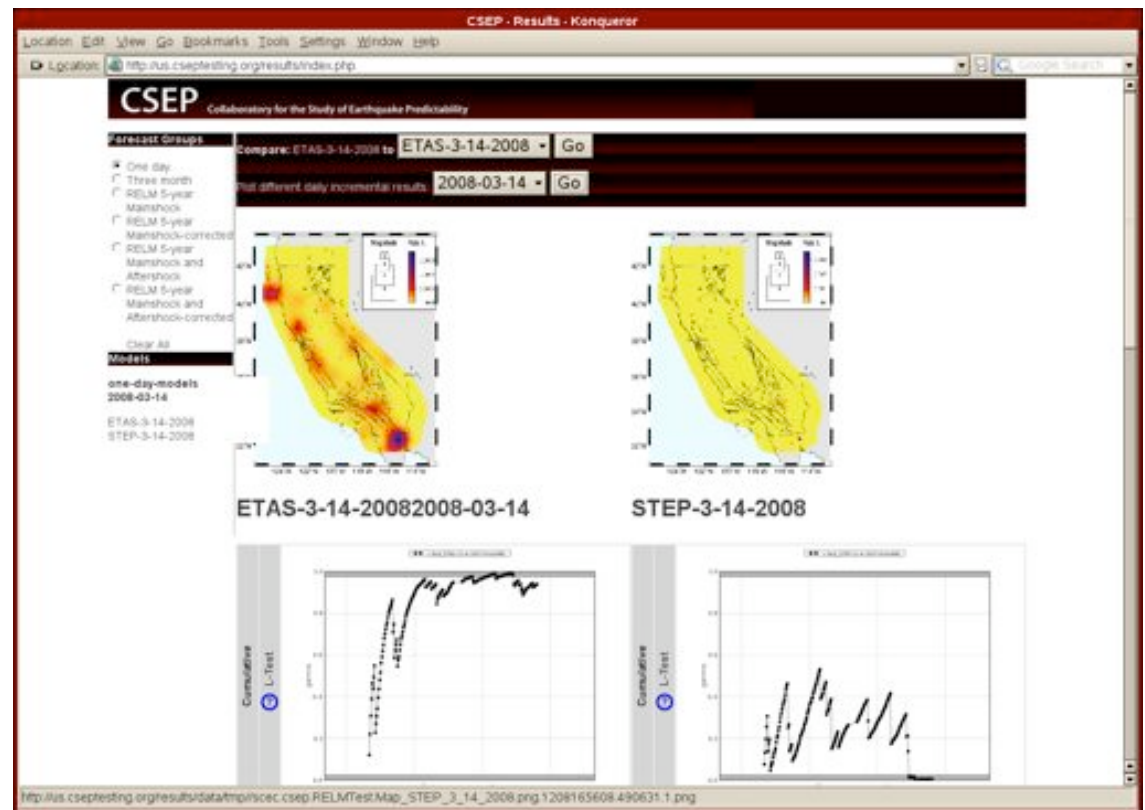
CSEP Working Groups

Data
— Working together with ANSS
— Review Process of work in Italy
— Whitepaper about catalog standards available

Global
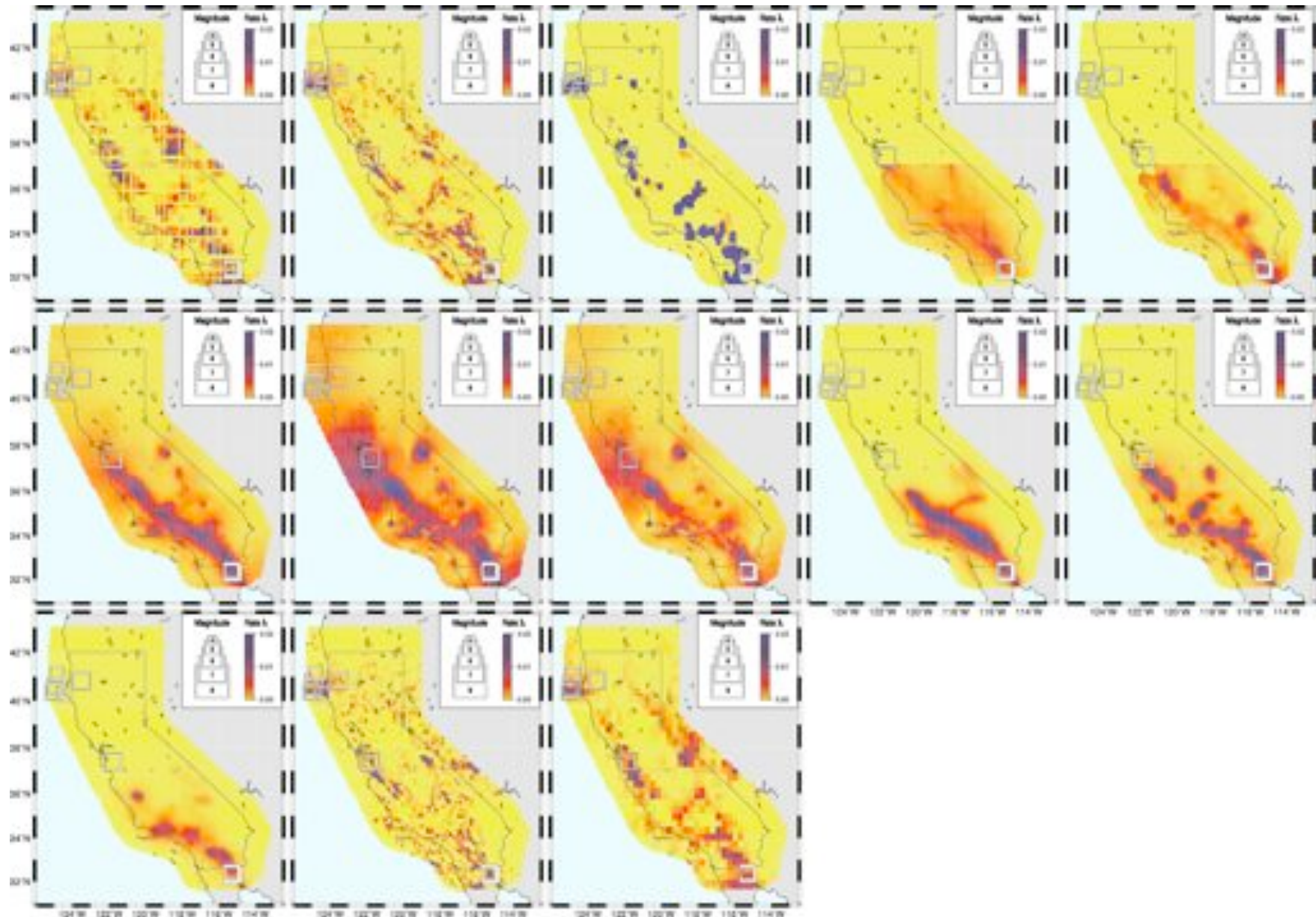— Meeting held 2008 and developments ongoing
 Expected start: 1 January 2009

Cyberinfrastructure
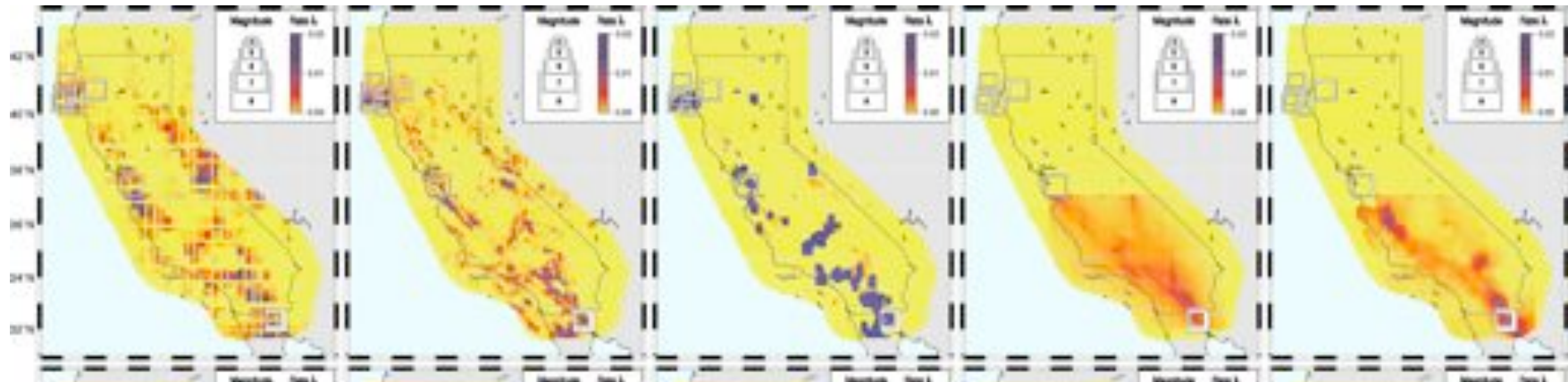— Software review meeting after initial release
— New meeting planned

Testing
— Meeting in 2008 for introducing alarm-based testing

First Results (RELM Models)

First Results (RELM Models)

Model	γ	δ
EBEL.MAINSHOCK	[0.017]	0.631
HELMSTETTER-ET-AL.MAINSHOCK	0.604	0.511
HOLLIDAY.PI	0.954	0.050
KAGAN-ET-AL.MAINSHOCK	0.730	0.285
SHEN-ET-AL.MAINSHOCK	0.667	0.400
WARD.COMBO81	0.966	0.041
WARD.GEODETIC81	0.997	[0.007]
WARD.GEODETIC85	0.854	0.173
WARD.GEOLOGIC81	0.922	0.082
WARD.SEISMIC81	0.893	0.102
WARD.SIMULATION	0.146	0.682
WIEMER-SCHORLEMMER.ALM	0.473	0.361

Table 3: L-Test and N-Test results for the mainshock forecast class. The statistics γ and δ measure the proportion of simulated likelihoods/numbers less than the observed likelihood/number. Bold values indicate that the observed target earthquake catalog is inconsistent with the corresponding forecast.

First Results (RELM Models)
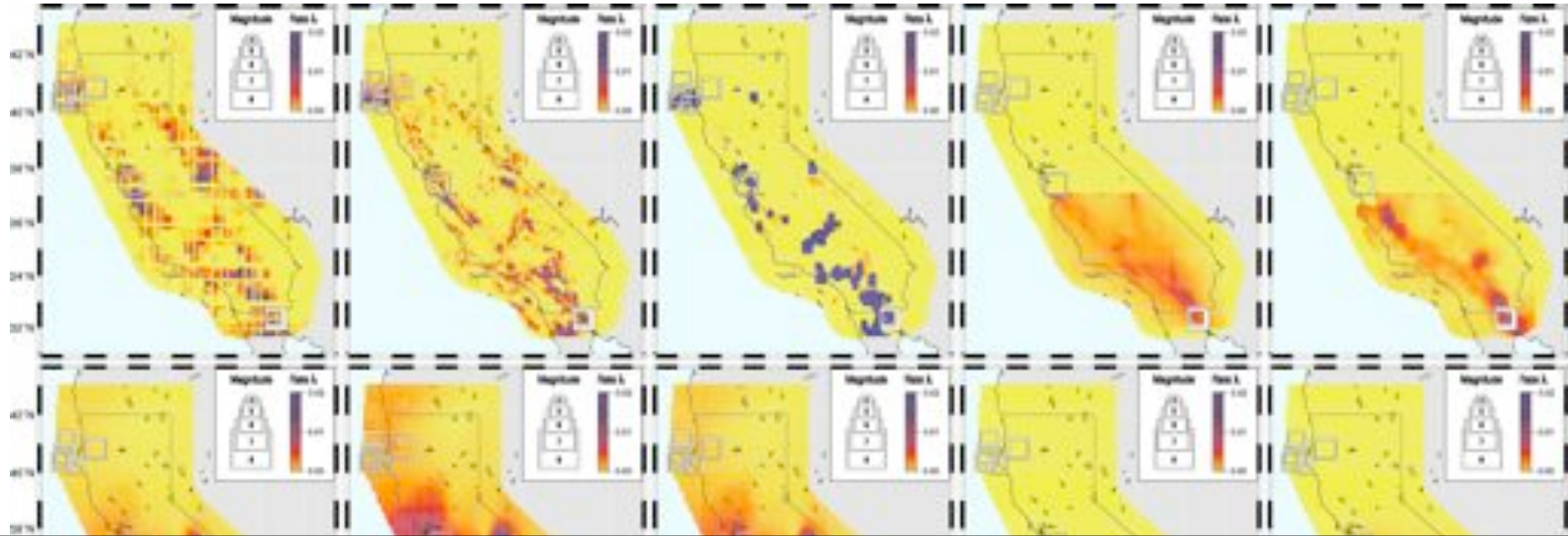
Model	0	1	2	3	4	5	6	7	8	9
0 HELMSTETTER-ET-AL.MAINSHOCK	—	[1.000]	[1.000]	[0.999]	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]
1 HOLLIDAY.PI	0.708	—	0.973	0.864	0.449	0.826	0.749	0.438	[1.000]	0.559
2 KAGAN-ET-AL.MAINSHOCK	0.738	[0.013]	—	0.030	0.799	0.672	0.812	0.518	[1.000]	0.615
3 SHEN-ET-AL.MAINSHOCK	0.328	[0.003]	[0.000]	—	[0.990]	[1.000]	[0.991]	0.964	[1.000]	0.766
4 WARD.COMBO81	0.868	[0.003]	0.085	0.626	—	0.759	0.836	0.254	[1.000]	0.062
5 WARD.GEODETIC85	0.868	[0.009]	0.076	[0.994]	0.217	—	0.944	0.612	[1.000]	0.059
6 WARD.GEOLOGIC81	0.704	[0.007]	0.045	0.450	0.174	0.104	—	0.729	[1.000]	0.164
7 WARD.SEISMIC81	0.798	[0.003]	[0.008]	0.314	[0.025]	0.042	[0.024]	—	[1.000]	0.138
8 WARD.SIMULATION	0.943	0.185	0.858	0.956	0.518	0.636	0.611	0.689	—	0.053
9 WIEMER-SCHORLEMMER.ALM	0.367	[0.000]	[0.000]	[0.001]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	—

Table 4: R-Test results for the mainshock forecast class. All models which are consistent with the observation in the L- and N-Tests are compared and their corresponding α-values are shown. If printed in bold, Model B (top row) should be rejected in favor of Model A (left column). The results show, that all models can be rejected in favor of model HELMSTETTER-ET-AL.MAINSHOCK.
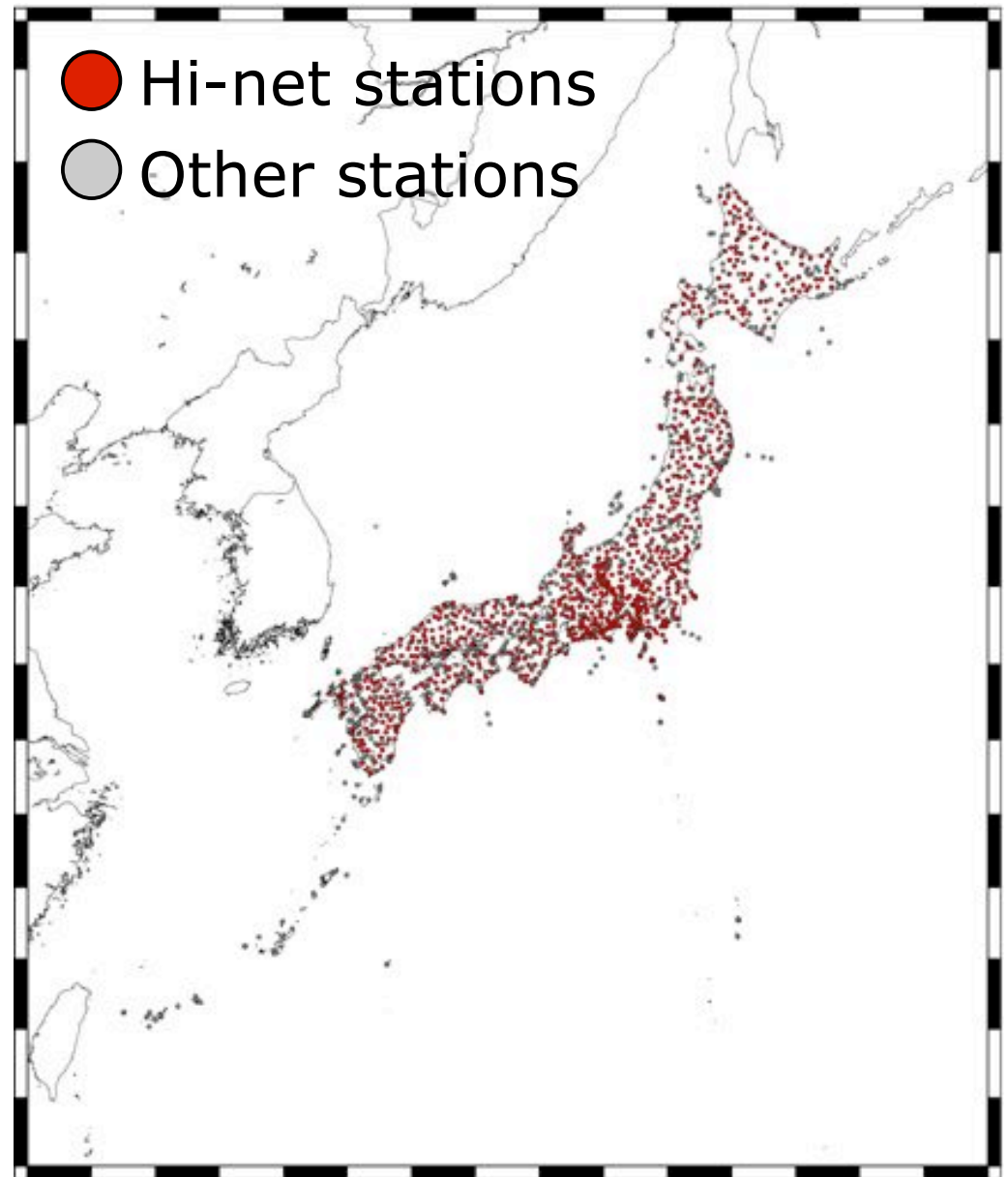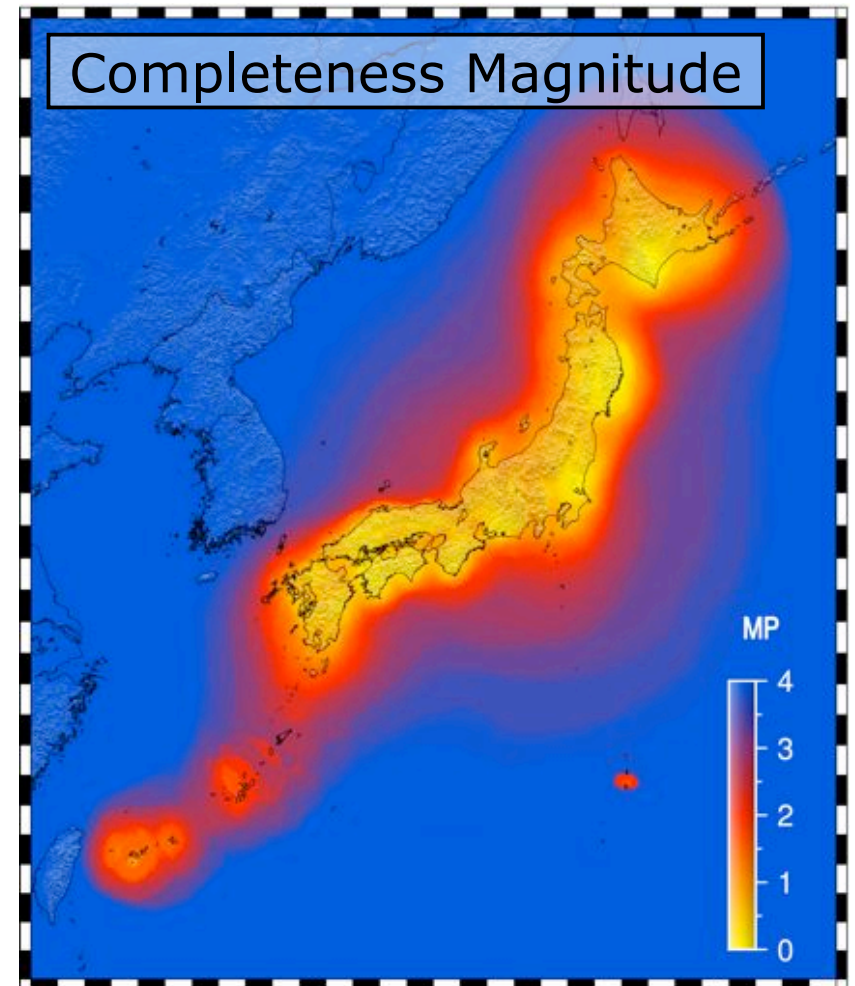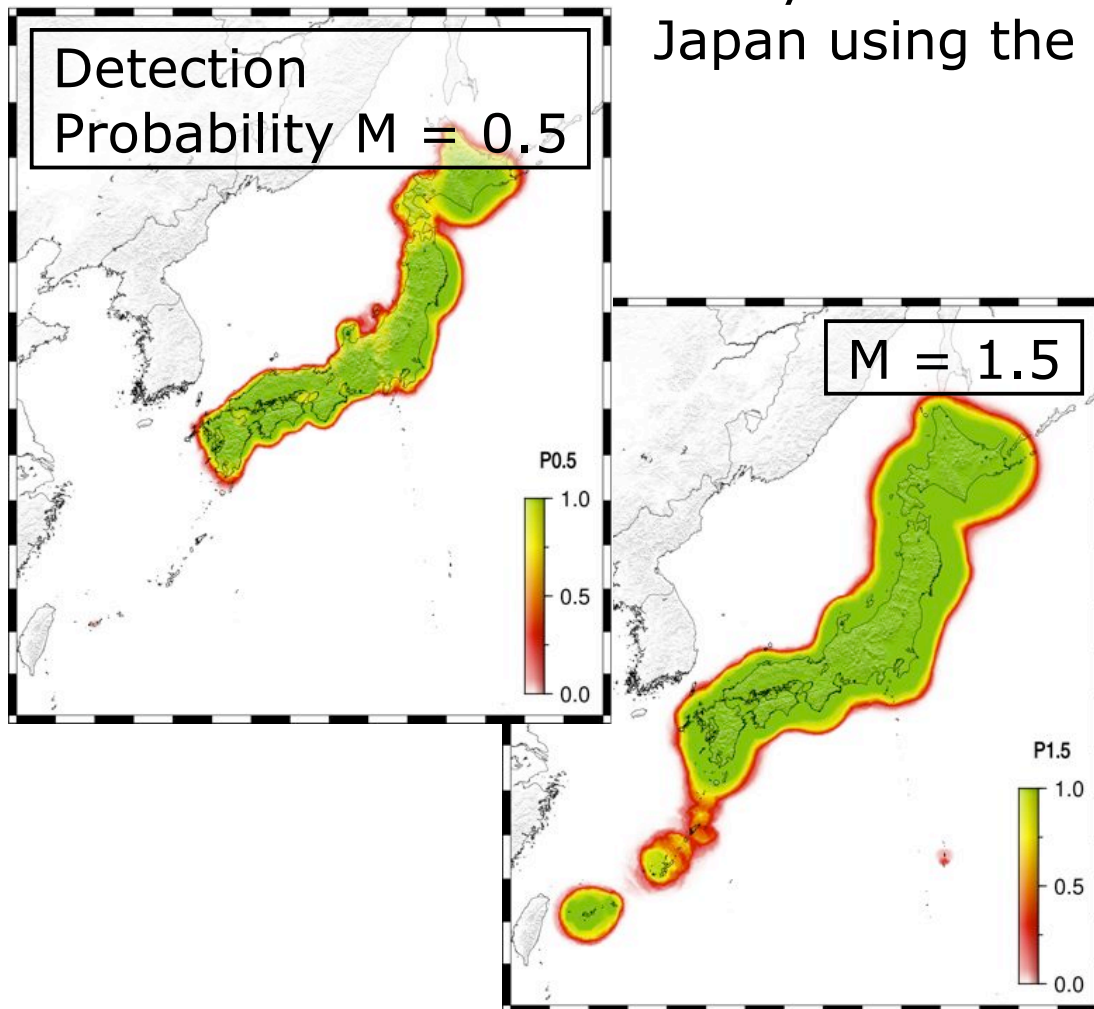
Summer in Japan

JMA catalog
- > 1000 stations
- 6 districts

Hi-net stations
Other stations

Completeness Study

Study of network detection completeness in Japan using the PMC method.

Detection Probability M = 0.5

M = 1.5

Completeness Magnitude

Summer in Japan

- Delineated testing region
- Setup a complete Testing Center
  - Result webpages in Japan
- Presented plans at the earthquake prediction program symposium
- Calibrated and installed 3 seismicity-based models for Japan:
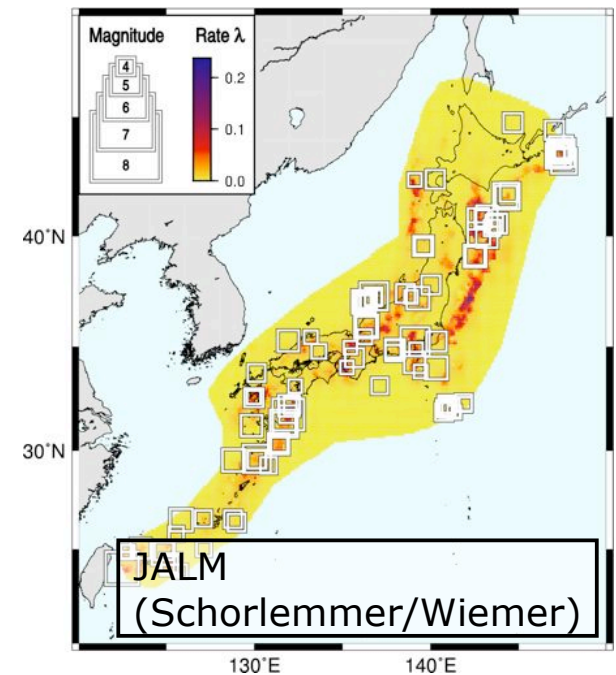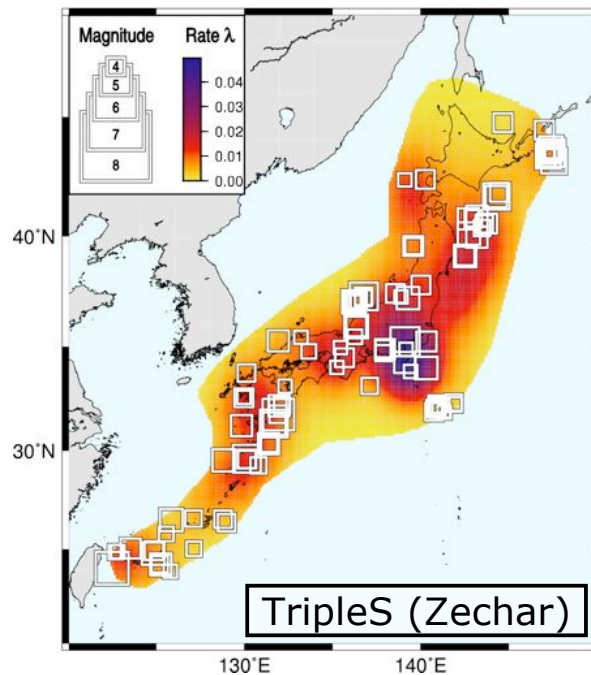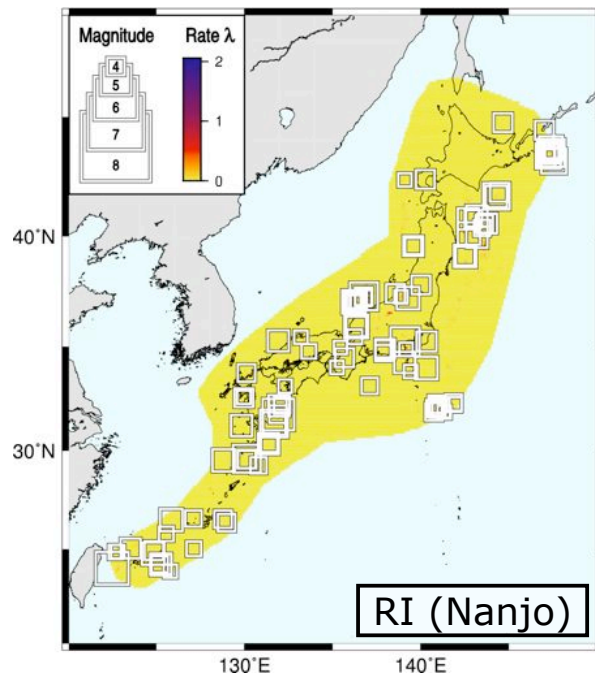
Future Plans in Japan

– Install more models

– Implement Tokyo region testing area

– Develop deep subduction earthquake testing

– Student and researcher exchange with SCEC

– Joint workshop with SCEC

– Collaboration on global testing

Plans at USC:

– Develop suite of basic models to be fully integrated in CSEP

Global Collaboration

Future Tasks

— Establish global testing (Collaboration)

— Intensifying our collaboration with ERI and Japan

— Student exchange with ERI

— Software development

— Unifying software deployment

— Model development coordination

— Support modelers (model integration)